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SEQUENCE LISTING

<110> DIVERSA CORPORATION
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SWANSON, Ronald

<120> TRANSAMINASES AND AMINOTRANSFERASES

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<140> US 09/389,537

<141> 1999-09-02

<150> US 08/646,590

<151> 1996-05-08

<150> US 08/599,171

<151> 1996-02-09

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 <213> *Aquifex*

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Trp	Arg	Val	Ala	Phe	Val	Val	Gly	Asn	Glu	Ile	Leu	Ile	Lys	Asn	Leu	260	265	270	
Ala	His	Leu	Lys	Ser	Tyr	Leu	Asp	Tyr	Gly	Ile	Phe	Thr	Pro	Ile	Gln	275	280	285	
Val	Ala	Ser	Ile	Ile	Ala	Leu	Glu	Ser	Pro	Tyr	Glu	Ile	Val	Glu	Lys	290	295	300	
Thr	Ala	Lys	Val	Tyr	Gln	Lys	Arg	Arg	Asp	Val	Leu	Val	Glu	Gly	Leu	305	310	315	320
Asn	Arg	Leu	Gly	Trp	Lys	Val	Lys	Lys	Pro	Lys	Ala	Thr	Met	Phe	Val	325	330	335	
Trp	Ala	Lys	Ile	Pro	Glu	Trp	Ile	Asn	Met	Asn	Ser	Leu	Asp	Phe	Ser				

340 345 350
 Leu Phe Leu Leu Lys Glu Ala Lys Val Ala Val Ser Pro Gly Val Gly
 355 360 365
 Phe Gly Gln Tyr Gly Glu Gly Tyr Val Arg Phe Ala Leu Val Glu Asn
 370 375 380
 Glu His Arg Ile Arg Gln Ala Ile Arg Gly Ile Arg Lys Ala Phe Arg
 385 390 395 400
 Lys Leu Gln Lys Glu Arg Lys Leu Glu Pro Glu Arg Ser Ala
 405 410

 <210> 26
 <211> 373
 <212> PRT
 <213> Aquifex

 <400> 26
 Met Asp Arg Leu Glu Lys Val Ser Pro Phe Ile Val Met Asp Ile Leu
 1 5 10 15
 Ala Gln Ala Gln Lys Tyr Glu Asp Val Val His Met Glu Ile Gly Glu
 20 25 30
 Pro Asp Leu Glu Pro Ser Pro Lys Val Met Glu Ala Leu Glu Arg Ala
 35 40 45
 Val Lys Glu Lys Thr Phe Phe Tyr Thr Pro Ala Leu Gly Leu Trp Glu
 50 55 60
 ----- Leu Arg Glu Arg Ile Ser Glu Phe Tyr Arg Lys Lys Tyr Ser Val Glu
 65 70 75 80
 Val Ser Pro Glu Arg Val Ile Val Thr Thr Gly Thr Ser Gly Ala Phe
 85 90 95
 Leu Val Ala Tyr Ala Val Thr Leu Asn Ala Gly Glu Lys Ile Ile Leu
 100 105 110
 Pro Asp Pro Ser Tyr Pro Cys Tyr Lys Asn Phe Ala Tyr Leu Leu Asp
 115 120 125
 Ala Gln Pro Val Phe Val Asn Val Asp Lys Glu Thr Asn Tyr Glu Val
 130 135 140
 Arg Lys Glu Met Ile Glu Asp Ile Asp Ala Lys Ala Leu His Ile Ser
 145 150 155 160
 Ser Pro Gln Asn Pro Thr Gly Thr Leu Tyr Ser Pro Glu Thr Leu Lys
 165 170 175
 Glu Leu Ala Glu Tyr Cys Glu Glu Lys Gly Met Tyr Phe Ile Ser Asp
 180 185 190
 Glu Ile Tyr His Gly Leu Val Tyr Glu Gly Arg Glu His Thr Ala Leu
 195 200 205
 Glu Phe Ser Asp Arg Ala Ile Val Ile Asn Gly Phe Ser Lys Tyr Phe

210	215	220
Cys Met Pro Gly Phe Arg Ile Gly Trp Met Ile Val Pro Glu Glu Leu		
225	230	235 240
Val Arg Lys Ala Glu Ile Val Ile Gln Asn Val Phe Ile Ser Ala Pro		
	245	250 255
Thr Leu Ser Gln Tyr Ala Ala Leu Glu Ala Phe Asp Tyr Glu Tyr Leu		
	260	265 270
Glu Lys Val Arg Lys Thr Phe Glu Glu Arg Arg Asn Phe Leu Tyr Gly		
	275	280 285
Glu Leu Lys Lys Leu Phe Lys Ile Asp Ala Lys Pro Gln Gly Ala Phe		
	290	295 300
Tyr Val Trp Ala Asn Ile Ser Asp Tyr Ser Thr Asp Ser Tyr Glu Phe		
305	310	315 320
Ala Leu Lys Leu Leu Arg Glu Ala Arg Val Ala Val Thr Pro Gly Val		
	325	330 335
Asp Phe Gly Lys Asn Lys Thr Lys Glu Tyr Ile Arg Phe Ala Tyr Thr		
	340	345 350
Arg Lys Ile Glu Glu Leu Lys Glu Gly Val Glu Arg Ile Lys Lys Phe		
	355	360 365
Leu Glu Lys Leu Ser		
370		

<210> 27
 <211> 453
 <212> PRT
 <213> Aquifex

<400> 27

Met Trp Glu Leu Asp Pro Lys Thr Leu Glu Lys Trp Asp Lys Glu Tyr		
1	5	10 15
Phe Trp His Pro Phe Thr Gln Met Lys Val Tyr Arg Glu Glu Glu Asn		
	20	25 30
Leu Ile Phe Glu Arg Gly Glu Gly Val Tyr Leu Trp Asp Ile Tyr Gly		
	35	40 45
Arg Lys Tyr Ile Asp Ala Ile Ser Ser Leu Trp Cys Asn Val His Gly		
	50	55 60
His Asn His Pro Lys Leu Asn Asn Ala Val Met Lys Gln Leu Cys Lys		
65	70	75 80
Val Ala His Thr Thr Thr Leu Gly Ser Ser Asn Val Pro Ala Ile Leu		
	85	90 95
Leu Ala Lys Lys Leu Val Glu Ile Ser Pro Glu Gly Leu Asn Lys Val		
	100	105 110
Phe Tyr Ser Glu Asp Gly Ala Glu Ala Val Glu Ile Ala Ile Lys Met		

115					120					125					
Ala	Tyr	His	Tyr	Trp	Lys	Asn	Lys	Gly	Val	Lys	Gly	Lys	Asn	Val	Phe
130						135					140				
Ile	Thr	Leu	Ser	Glu	Ala	Tyr	His	Gly	Asp	Thr	Val	Gly	Ala	Val	Ser
145						150					155				160
Val	Gly	Gly	Ile	Glu	Leu	Phe	His	Gly	Thr	Tyr	Lys	Asp	Leu	Leu	Phe
				165					170					175	
Lys	Thr	Ile	Lys	Leu	Pro	Ser	Pro	Tyr	Leu	Tyr	Cys	Lys	Glu	Lys	Tyr
			180					185					190		
Gly	Glu	Leu	Cys	Pro	Glu	Cys	Thr	Ala	Asp	Leu	Leu	Lys	Gln	Leu	Glu
		195					200					205			
Asp	Ile	Leu	Lys	Ser	Arg	Glu	Asp	Ile	Val	Ala	Val	Ile	Met	Glu	Ala
	210					215					220				
Gly	Ile	Gln	Ala	Ala	Ala	Gly	Met	Leu	Pro	Phe	Pro	Pro	Gly	Phe	Leu
225						230					235				240
Lys	Gly	Val	Arg	Glu	Leu	Thr	Lys	Lys	Tyr	Asp	Thr	Leu	Met	Ile	Val
				245					250					255	
Asp	Glu	Val	Ala	Thr	Gly	Phe	Gly	Arg	Thr	Gly	Thr	Met	Phe	Tyr	Cys
			260					265					270		
Glu	Gln	Glu	Gly	Val	Ser	Pro	Asp	Phe	Met	Cys	Leu	Gly	Lys	Gly	Ile
	275						280					285			
Thr	Gly	Gly	Tyr	Leu	Pro	Leu	Ala	Ala	Thr	Leu	Thr	Thr	Asp	Glu	Val
	290					295					300				
Phe	Asn	Ala	Phe	Leu	Gly	Glu	Phe	Gly	Glu	Ala	Lys	His	Phe	Tyr	His
305						310					315				320
Gly	His	Thr	Tyr	Thr	Gly	Asn	Asn	Leu	Ala	Cys	Ser	Val	Ala	Leu	Ala
				325					330					335	
Asn	Leu	Glu	Val	Phe	Glu	Glu	Glu	Arg	Thr	Leu	Glu	Lys	Leu	Gln	Pro
			340					345					350		
Lys	Ile	Lys	Leu	Leu	Lys	Glu	Arg	Leu	Gln	Glu	Phe	Trp	Glu	Leu	Lys
		355					360					365			
His	Val	Gly	Asp	Val	Arg	Gln	Leu	Gly	Phe	Met	Ala	Gly	Ile	Glu	Leu
	370					375					380				
Val	Lys	Asp	Lys	Glu	Lys	Gly	Glu	Pro	Phe	Pro	Tyr	Gly	Glu	Arg	Thr
385						390					395				400
Gly	Phe	Lys	Val	Ala	Tyr	Lys	Cys	Arg	Glu	Lys	Gly	Val	Phe	Leu	Arg
				405					410					415	
Pro	Leu	Gly	Asp	Val	Met	Val	Leu	Met	Met	Pro	Leu	Val	Ile	Glu	Glu
			420					425					430		
Asp	Glu	Met	Asn	Tyr	Val	Ile	Asp	Thr	Leu	Lys	Trp	Ala	Ile	Lys	Glu
	435						440					445			

Leu Glu Lys Glu Val
450

<210> 28
<211> 343
<212> PRT
<213> Aquifex

<400> 28

Met Thr Tyr Leu Met Asn Asn Tyr Ala Arg Leu Pro Val Lys Phe Val
1 5 10 15

Arg Gly Lys Gly Val Tyr Leu Tyr Asp Glu Glu Gly Lys Glu Tyr Leu
20 25 30

Asp Phe Val Ser Gly Ile Gly Val Asn Ser Leu Gly His Ala Tyr Pro
35 40 45

Lys Leu Thr Glu Ala Leu Lys Glu Gln Val Glu Lys Leu Leu His Val
50 55 60

Ser Asn Leu Tyr Glu Asn Pro Trp Gln Glu Glu Leu Ala His Lys Leu
65 70 75 80

Val Lys His Phe Trp Thr Glu Gly Lys Val Phe Phe Ala Asn Ser Gly
85 90 95

Thr Glu Ser Val Glu Ala Ala Ile Lys Leu Ala Arg Lys Tyr Trp Arg
100 105 110

Asp Lys Gly Lys Asn Lys Trp Lys Phe Ile Ser Phe Glu Asn Ser Phe
115 120 125

His Gly Arg Thr Tyr Gly Ser Leu Ser Ala Thr Gly Gln Pro Lys Phe
130 135 140

His Lys Gly Phe Glu Pro Leu Val Pro Gly Phe Ser Tyr Ala Lys Leu
145 150 155 160

Asn Asp Ile Asp Ser Val Tyr Lys Leu Leu Asp Glu Glu Thr Ala Gly
165 170 175

Ile Ile Ile Glu Val Ile Gln Gly Glu Gly Gly Val Asn Glu Ala Ser
180 185 190

Glu Asp Phe Leu Ser Lys Leu Gln Glu Ile Cys Lys Glu Lys Asp Val
195 200 205

Leu Leu Ile Ile Asp Glu Val Gln Thr Gly Ile Gly Arg Thr Gly Glu
210 215 220

Phe Tyr Ala Tyr Gln His Phe Asn Leu Lys Pro Asp Val Ile Ala Leu
225 230 235 240

Ala Lys Gly Leu Gly Gly Gly Val Pro Ile Gly Ala Ile Leu Ala Arg
245 250 255

Glu Glu Val Ala Gln Ser Phe Thr Pro Gly Ser His Gly Ser Thr Phe
260 265 270

Gly Gly Asn Pro Leu Ala Cys Arg Ala Gly Thr Val Val Val Asp Glu
275 280 285

Val Glu Lys Leu Leu Pro His Val Arg Glu Val Gly Asn Tyr Phe Lys
290 295 300

Glu Lys Leu Lys Glu Leu Gly Lys Gly Lys Val Lys Gly Arg Gly Leu
305 310 315 320

Met Leu Gly Leu Glu Leu Glu Arg Glu Cys Lys Asp Tyr Val Leu Lys
325 330 335

Ala Leu Glu Arg Asp Phe Ser
340

<210> 29

<211> 398

<212> PRT

<213> Ammonifex degensii

<400> 29

Met Arg Lys Leu Ala Glu Arg Ala Gln Lys Leu Ser Pro Ser Pro Thr
1 5 10 15

Leu Ser Val Asp Thr Lys Ala Lys Glu Leu Leu Arg Gln Gly Glu Arg
20 25 30

Val Ile Asn Phe Gly Ala Gly Glu Pro Asp Phe Asp Thr Pro Glu His
35 40 45

Ile Lys Glu Ala Ala Lys Arg Ala Leu Asp Gln Gly Phe Thr Lys Tyr
50 55 60

Thr Pro Val Ala Gly Ile Leu Pro Leu Arg Glu Ala Ile Cys Glu Lys
65 70 75 80

Leu Tyr Arg Asp Asn Gln Leu Glu Tyr Ser Pro Asn Glu Ile Val Val
85 90 95

Ser Cys Gly Ala Lys His Ser Ile Phe Asn Ala Leu Gln Val Leu Leu
100 105 110

Asp Pro Gly Asp Glu Val Ile Ile Pro Val Pro Tyr Trp Thr Ser Tyr
115 120 125

Pro Glu Gln Val Lys Leu Ala Gly Gly Val Pro Val Phe Val Pro Thr
130 135 140

Ser Pro Glu Asn Asp Phe Lys Leu Arg Pro Glu Asp Leu Arg Ala Ala
145 150 155 160

Val Thr Pro Arg Thr Arg Leu Leu Ile Leu Asn Ser Pro Ala Asn Pro
165 170 175

Thr Gly Thr Val Tyr Arg Arg Glu Glu Leu Ile Gly Leu Ala Glu Val
180 185 190

Ala Leu Glu Ala Asp Leu Trp Ile Leu Ser Asp Glu Ile Tyr Glu Lys
195 200 205

Leu Ile Tyr Asp Gly Met Glu His Val Ser Ile Ala Ala Leu Asp Pro
 210 215 220
 Glu Val Lys Lys Arg Thr Ile Val Val Asn Gly Val Ser Lys Ala Tyr
 225 230 235 240
 Ala Met Thr Gly Trp Arg Ile Gly Tyr Ala Ala Ala Pro Arg Pro Ile
 245 250 255
 Ala Gln Ala Met Thr Asn Leu Gln Ser His Ser Thr Ser Asn Pro Thr
 260 265 270
 Ser Val Ala Gln Ala Ala Ala Leu Ala Ala Leu Lys Gly Pro Gln Glu
 275 280 285
 Pro Val Glu Asn Met Arg Arg Ala Phe Gln Lys Arg Arg Asp Phe Ile
 290 295 300
 Trp Gln Tyr Leu Asn Ser Leu Pro Gly Val Arg Cys Pro Lys Pro Leu
 305 310 315 320
 Gly Ala Phe Tyr Val Phe Pro Glu Val Glu Arg Ala Phe Gly Pro Pro
 325 330 335
 Ser Lys Arg Thr Gly Asn Thr Thr Ala Ser Asp Leu Ala Leu Phe Leu
 340 345 350
 Leu Glu Glu Ile Lys Val Ala Thr Val Ala Gly Ala Ala Phe Gly Asp
 355 360 365
 Asp Arg Tyr Leu Arg Phe Ser Tyr Ala Leu Arg Leu Glu Asp Ile Glu
 370 375 380

Glu Gly Met Gln Arg Phe Lys Glu Leu Ile Glu Ala Ala Leu
 385 390 395

<210> 30
 <211> 592,
 <212> PRT
 <213> Aquifex

<400> 30

Met Cys Gly Ile Val Gly Tyr Val Gly Arg Asp Leu Ala Leu Pro Ile
 1 5 10 15
 Val Leu Gly Ala Leu Glu Arg Leu Glu Tyr Arg Gly Tyr Asp Ser Ala
 20 25 30
 Gly Val Ala Leu Ile Glu Asp Gly Lys Leu Ile Val Glu Lys Lys Lys
 35 40 45
 Gly Lys Ile Arg Glu Leu Val Lys Ala Leu Trp Gly Lys Asp Tyr Lys
 50 55 60
 Ala Lys Thr Gly Ile Gly His Thr Arg Trp Ala Thr His Gly Lys Pro
 65 70 75 80
 Thr Asp Glu Asn Ala His Pro His Thr Asp Glu Lys Gly Glu Phe Ala
 85 90 95

Val	Val	His	Asn	Gly	Ile	Ile	Glu	Asn	Tyr	Leu	Glu	Leu	Lys	Glu	Glu	
			100					105					110			
Leu	Lys	Lys	Glu	Gly	Val	Lys	Phe	Arg	Ser	Glu	Thr	Asp	Thr	Glu	Val	
		115					120					125				
Ile	Ala	His	Leu	Ile	Ala	Lys	Asn	Tyr	Arg	Gly	Asp	Leu	Leu	Glu	Ala	
	130					135					140					
Val	Leu	Lys	Thr	Val	Lys	Lys	Leu	Lys	Gly	Ala	Phe	Ala	Phe	Ala	Val	
145					150					155					160	
Ile	Thr	Val	His	Glu	Pro	Asn	Arg	Leu	Ile	Gly	Val	Lys	Gln	Gly	Ser	
				165					170					175		
Pro	Leu	Ile	Val	Gly	Leu	Gly	Glu	Gly	Glu	Asn	Phe	Leu	Ala	Ser	Asp	
			180					185					190			
Ile	Pro	Ala	Ile	Leu	Pro	Tyr	Thr	Lys	Lys	Ile	Ile	Val	Leu	Asp	Asp	
		195					200					205				
Gly	Glu	Ile	Ala	Asp	Leu	Thr	Pro	Asp	Thr	Val	Asn	Ile	Tyr	Asn	Phe	
	210					215					220					
Glu	Gly	Glu	Pro	Val	Ser	Lys	Glu	Val	Met	Ile	Thr	Pro	Trp	Asp	Leu	
225					230					235					240	
Val	Ser	Ala	Glu	Lys	Gly	Gly	Phe	Lys	His	Phe	Met	Leu	Lys	Glu	Ile	
				245					250					255		
Tyr	Glu	Gln	Pro	Lys	Ala	Ile	Asn	Asp	Thr	Leu	Lys	Gly	Phe	Leu	Ser	
			260					265					270			
Thr	Glu	Asp	Ala	Ile	Pro	Phe	Lys	Leu	Lys	Asp	Phe	Arg	Arg	Val	Leu	
		275					280					285				
Ile	Ile	Ala	Cys	Gly	Thr	Ser	Tyr	His	Ala	Gly	Phe	Val	Gly	Lys	Tyr	
	290					295					300					
Trp	Ile	Glu	Arg	Phe	Ala	Gly	Val	Pro	Thr	Glu	Val	Ile	Tyr	Ala	Ser	
305					310					315					320	
Glu	Phe	Arg	Tyr	Ala	Asp	Val	Pro	Val	Ser	Asp	Lys	Asp	Ile	Val	Ile	
				325					330					335		
Gly	Ile	Ser	Gln	Ser	Gly	Glu	Thr	Ala	Asp	Thr	Lys	Phe	Ala	Leu	Gln	
			340					345					350			
Ser	Ala	Lys	Glu	Lys	Gly	Ala	Phe	Thr	Val	Gly	Leu	Val	Asn	Val	Val	
		355					360					365				
Gly	Ser	Ala	Ile	Asp	Arg	Glu	Ser	Asp	Phe	Ser	Leu	His	Thr	His	Ala	
	370					375					380					
Gly	Pro	Glu	Ile	Gly	Val	Ala	Ala	Thr	Lys	Thr	Phe	Thr	Ala	Gln	Phe	
385					390					395					400	
Thr	Ala	Leu	Tyr	Ala	Leu	Ser	Val	Arg	Glu	Ser	Glu	Glu	Arg	Glu	Asn	
				405					410					415		

Leu Ile Arg Leu Leu Glu Lys Val Pro Ser Leu Val Glu Gln Thr Leu
 420 425 430

Asn Thr Ala Glu Glu Val Glu Lys Val Ala Glu Lys Tyr Met Lys Lys
 435 440 445

Lys Asn Met Leu Tyr Leu Gly Arg Tyr Leu Asn Tyr Pro Ile Ala Leu
 450 455 460

Glu Gly Ala Leu Lys Leu Lys Glu Ile Ser Tyr Ile His Ala Glu Gly
 465 470 475 480

Tyr Pro Ala Gly Glu Met Lys His Gly Pro Ile Ala Leu Ile Asp Glu
 485 490 495

Asn Met Pro Val Val Val Ile Ala Pro Lys Asp Arg Val Tyr Glu Lys
 500 505 510

Ile Leu Ser Asn Val Glu Glu Val Leu Ala Arg Lys Gly Arg Val Ile
 515 520 525

Ser Val Gly Phe Lys Gly Asp Glu Thr Leu Lys Ser Lys Ser Glu Ser
 530 535 540

Val Met Glu Ile Pro Lys Ala Glu Glu Pro Ile Thr Pro Phe Leu Thr
 545 550 555 560

Val Ile Pro Leu Gln Leu Phe Ala Tyr Phe Ile Ala Ser Lys Leu Gly
 565 570 575

Leu Asp Val Asp Gln Pro Arg Asn Leu Ala Lys Thr Val Thr Val Glu
 580 585 590

<210> 31
 <211> 354
 <212> PRT
 <213> Aquifex

<400> 31

Met Ile Pro Gln Arg Ile Lys Glu Leu Glu Ala Tyr Lys Thr Glu Val
 1 5 10 15

Thr Pro Ala Ser Val Arg Leu Ser Ser Asn Glu Phe Pro Tyr Asp Phe
 20 25 30

Pro Glu Glu Ile Lys Gln Arg Ala Leu Glu Glu Leu Lys Lys Val Pro
 35 40 45

Leu Asn Lys Tyr Pro Asp Pro Glu Ala Lys Glu Leu Lys Ala Val Leu
 50 55 60

Ala Asp Phe Phe Gly Val Lys Glu Glu Asn Leu Val Leu Gly Asn Gly
 65 70 75 80

Ser Asp Glu Leu Ile Tyr Tyr Leu Ser Ile Ala Ile Gly Glu Leu Tyr
 85 90 95

Ile Pro Val Tyr Ile Pro Val Pro Thr Phe Pro Met Tyr Glu Ile Ser
 100 105 110

Ala Lys Val Leu Gly Arg Pro Leu Val Lys Val Gln Leu Asp Glu Asn
115 120 125

Phe Asp Ile Asp Leu Glu Arg Ser Ile Glu Leu Ile Glu Lys Glu Lys
130 135 140

Pro Val Leu Gly Tyr Phe Ala Tyr Pro Asn Asn Pro Thr Gly Asn Leu
145 150 155 160

Phe Ser Arg Gly Lys Ile Glu Glu Ile Arg Asn Arg Gly Val Phe Cys
165 170 175

Val Ile Asp Glu Ala Tyr Tyr His Tyr Ser Gly Glu Thr Phe Leu Glu
180 185 190

Asp Ala Leu Lys Arg Glu Asp Thr Val Val Leu Arg Thr Leu Ser Lys
195 200 205

Ile Gly Met Ala Ser Leu Arg Val Gly Ile Leu Ile Gly Lys Gly Glu
210 215 220

Ile Val Ser Glu Ile Asn Lys Val Arg Leu Pro Phe Asn Val Thr Tyr
225 230 235 240

Pro Ser Gln Val Met Ala Lys Val Leu Leu Thr Glu Gly Arg Glu Phe
245 250 255

Leu Met Glu Lys Ile Gln Glu Val Val Thr Glu Arg Glu Arg Met Tyr
260 265 270

Asp Glu Met Lys Lys Ile Glu Gly Val Glu Val Phe Pro Ser Lys Ala
275 280 285

Asn Phe Leu Leu Phe Arg Thr Pro Tyr Pro Ala His Glu Val Tyr Gln
290 295 300

Glu Leu Leu Lys Arg Asp Val Leu Val Arg Asn Val Ser Tyr Met Glu
305 310 315 320

Gly Leu Gln Lys Cys Leu Arg Val Ser Val Gly Lys Pro Glu Glu Asn
325 330 335

Asn Lys Phe Leu Glu Ala Leu Glu Glu Ser Ile Lys Ser Leu Ser Ser
340 345 350

Ser Leu

<210> 32
<211> 303
<212> PRT

<213> Pyrobaculum aerophilum
<400> 32

Met Lys Pro Tyr Ala Lys Tyr Ile Trp Leu Asp Gly Arg Ile Leu Lys
1 5 10 15

Trp Glu Asp Ala Lys Ile His Val Leu Thr His Ala Leu His Tyr Gly
20 25 30

Thr Ser Ile Phe Glu Gly Ile Arg Gly Tyr Trp Asn Gly Asp Asn Leu
 35 40 45
 Leu Val Phe Arg Leu Glu Glu His Ile Asp Arg Met Tyr Arg Ser Ala
 50 55 60
 Lys Ile Leu Gly Ile Asn Ile Pro Tyr Thr Arg Glu Glu Val Arg Gln
 65 70 75 80
 Ala Val Leu Glu Thr Ile Lys Ala Asn Asn Phe Arg Glu Asp Val Tyr
 85 90 95
 Ile Arg Pro Val Ala Phe Val Ala Ser Gln Thr Val Thr Leu Asp Ile
 100 105 110
 Arg Asn Leu Glu Val Ser Leu Ala Val Ile Val Phe Pro Phe Gly Lys
 115 120 125
 Tyr Leu Ser Pro Asn Gly Ile Lys Ala Thr Ile Val Ser Trp Arg Arg
 130 135 140
 Val His Asn Thr Met Leu Pro Val Met Ala Lys Ile Gly Gly Ile Tyr
 145 150 155 160
 Val Asn Ser Val Leu Ala Leu Val Glu Ala Arg Ser Arg Gly Phe Asp
 165 170 175
 Glu Ala Leu Leu Met Asp Val Asn Gly Tyr Val Val Glu Gly Ser Gly
 180 185 190
 Glu Asn Ile Phe Ile Val Arg Gly Gly Arg Leu Phe Thr Pro Pro Val
 195 200 205
 His Glu Ser Ile Leu Glu Gly Ile Thr Arg Asp Thr Val Ile Lys Leu
 210 215 220
 Ser Gly Asp Val Gly Leu Arg Val Glu Glu Lys Pro Ile Thr Arg Glu
 225 230 235 240
 Glu Val Tyr Thr Ala Asp Glu Val Phe Leu Val Gly Thr Ala Ala Glu
 245 250 255
 Ile Thr Pro Val Val Glu Val Asp Gly Arg Thr Ile Gly Thr Gly Lys
 260 265 270
 Pro Gly Pro Ile Thr Thr Lys Ile Ala Glu Leu Tyr Ser Asn Val Val
 275 280 285
 Arg Gly Lys Val Glu Lys Tyr Leu Asn Trp Ile Thr Pro Val Tyr
 290 295 300

<210> 33

<211> 52

<212> DNA

<213> Artificial sequence

<220>

<223> Primer for PCR

<400> 33

ccgagaattc attaaagagg agaaattaac tatggcagtc aaagtgcggc ct

<210> 34
 <211> 31
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Primer for PCR

<400> 34
 gaaggacctt cgaaacctat tcctaggagg c 31

<210> 35
 <211> 1092
 <212> DNA
 <213> Ammonifex degensii

<220>
 <221> misc_feature
 <222> (986)..(987)
 <223> n is any nucleotide

<400> 35
 atggcagtca aagtgcggcc tgagctcagc caggtggaga tctaccgtcc cggcaaacc 60
 atcgaagagg taaagaagga gctggggctg gaggaggtag tcaagctggc ctccaacgag 120
 aaccctctgg gaccttctcc caaggccgtg gcggcgctgg agggactgga ccaactggcac 180
 ctttaccag aaggctcaag ctatgagcta cggcaggcgc tgggtaagaa actggagata 240

 gacccggaca gcatcatcgt gggttgcggc tcaagcgaag tcatccagat gctctctttg 300
 gccctgctgg cgcccgga cgaggtggtc atccctgtgc ctacctttcc ccgctatgag 360
 cccctggcac ggctcatggg ggctaattcc gtaaaagtgc ccttgaagga ctaccgcac 420
 gatgtggagg cagtggccc agccctttcc ccccgtagca agctgggtcta cctatgcaac 480
 cccaacaacc ccaccgggac catcgtcacc cgggaggagg tggagtgggt cttggaaaag 540
 gcgggggagg gggttctcac cgtgctggac gaggcctact gcgagtacgt gaccagcccc 600
 gcctaccctg atgggctcga tttcctgcgc cggggctaca atgtgggtgg gctgcgaccc 660
 ttctccaaga tctacgggct ggccgggctg cgcatagggt acggtgtggc ggacagggag 720
 ctggtggcgg aactgcaccg ggtgcgggag cctttcaatg tcagttccgc tgctcagata 780
 gccgccctgg ccgccctgga agacgaagag ttcgtggcgc tttcgcgcca ggtcaacgaa 840
 gaagggaaagg tttttctcta ccgagaactg gagaggcggg ggatcgcccta cgtgccacc 900
 gaggccaact tcctactctt cgatgccggt cgggacgagc aggaagtatt tcgccggatg 960
 ctgcccagg gagtgatcat ccgggncggg gtgggttata ccaccactt aagggtgacc 1020
 atcggcacct tggaacagaa ccagcgcttc ctggaagctt tggataaggc tctagagctt 1080

agggggggttt aa

1092

<210> 36
 <211> 363
 <212> PRT
 <213> Ammonifex degensii

<220>
 <221> VARIANT

<222> (329)..(330)
 <223> Xaa is any Amino Acid

<400> 36

Met Ala Val Lys Val Arg Pro Glu Leu Ser Gln Val Glu Ile Tyr Arg
 1 5 10 15

Pro Gly Lys Pro Ile Glu Glu Val Lys Lys Glu Leu Gly Leu Glu Glu
 20 25 30

Val Val Lys Leu Ala Ser Asn Glu Asn Pro Leu Gly Pro Ser Pro Lys
 35 40 45

Ala Val Ala Ala Leu Glu Gly Leu Asp His Trp His Leu Tyr Pro Glu
 50 55 60

Gly Ser Ser Tyr Glu Leu Arg Gln Ala Leu Gly Lys Lys Leu Glu Ile
 65 70 75 80

Asp Pro Asp Ser Ile Ile Val Gly Cys Gly Ser Ser Glu Val Ile Gln
 85 90 95

Met Leu Ser Leu Ala Leu Leu Ala Pro Gly Asp Glu Val Val Ile Pro
 100 105 110

Val Pro Thr Phe Pro Arg Tyr Glu Pro Leu Ala Arg Leu Met Gly Ala
 115 120 125

Asn Pro Val Lys Val Pro Leu Lys Asp Tyr Arg Ile Asp Val Glu Ala
 130 135 140

Val Ala Arg Ala Leu Ser Pro Arg Thr Lys Leu Val Tyr Leu Cys Asn
 145 150 155 160

Pro Asn Asn Pro Thr Gly Thr Ile Val Thr Arg Glu Glu Val Glu Trp
 165 170 175

Phe Leu Glu Lys Ala Gly Glu Gly Val Leu Thr Val Leu Asp Glu Ala
 180 185 190

Tyr Cys Glu Tyr Val Thr Ser Pro Ala Tyr Pro Asp Gly Leu Asp Phe
 195 200 205

Leu Arg Arg Gly Tyr Asn Val Val Val Leu Arg Thr Phe Ser Lys Ile
 210 215 220

Tyr Gly Leu Ala Gly Leu Arg Ile Gly Tyr Gly Val Ala Asp Arg Glu
 225 230 235 240

Leu Val Ala Glu Leu His Arg Val Arg Glu Pro Phe Asn Val Ser Ser
 245 250 255

Ala Ala Gln Ile Ala Ala Leu Ala Ala Leu Glu Asp Glu Glu Phe Val
 260 265 270

Ala Leu Ser Arg Gln Val Asn Glu Glu Gly Lys Val Phe Leu Tyr Arg
 275 280 285

Glu Leu Glu Arg Arg Gly Ile Ala Tyr Val Pro Thr Glu Ala Asn Phe
 290 295 300

Leu Leu Phe Asp Ala Gly Arg Asp Glu Gln Glu Val Phe Arg Arg Met
 305 310 315 320

Leu Arg Gln Gly Val Ile Ile Arg Xaa Gly Val Gly Tyr Pro Thr His
 325 330 335

Leu Arg Val Thr Ile Gly Thr Leu Glu Gln Asn Gln Arg Phe Leu Glu
 340 345 350

Ala Leu Asp Lys Ala Leu Glu Leu Arg Gly Val
 355 360

<210> 37
 <211> 52
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Primer for PCR

-----<400> 37-----52
 ccgagaattc attaaagagg agaaattaac tatgagaaaa ggacttgcaa gt

<210> 38
 <211> 31
 <212> DNA
 <213> Artificial sequence

<220>
 <223> Primer for PCR

<400> 38-----31
 ttctcggaac ttctctagat tcctaggagg c

<210> 39
 <211> 1185
 <212> DNA
 <213> Aquifex

<400> 39-----60
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 accgcaaaaag caaaagaatt aagggtctaaa ggagtggacg ttatagggtt tggagcggga 120
 gaacctgact tcgacacacc cgacttcata aaggaagcct gtataagggc tttaagggaa 180

ggaaagacca agtacgctcc ctccgcggga ataccagagc tcagagaagc tatagctgaa 240
 aaactactga aagaaaacaa agttgagtagc aaaccttcag agatagtcgt ttccgcagga 300
 gcgaaaatgg ttctcttcct catattcatg gctatactgg acgaaggaga cgagggttta 360
 ctacctagcc cttactgggt aacttacccc gaacagataa ggttcttcgg aggggttccc 420
 gttgaggttc ctctaaagaa agagaaagga tttcaattaa gtctggaaga tgtgaaagaa 480
 aagggttacgg agagaacaaa agctatagtc ataaactctc cgaacaaccc cactggtgct 540
 gtttacgaag aggaggaact taagaaaata gcggagtttt gcgtggagag gggcattttc 600
 ataatttccg atgagtgcta tgagtacttc gtttacgggtg atgcaaaatt tgttagccct 660
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 gaaaggagaa gggatacggc tgtagaagag ctttctaaaa ttccagggtat ggatgtggta 960
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 ggtgatgtga aactctcgga gttccttctg gaaaaggcta aggttgcggt ggttcccgggt 1080
 tcggccttcg gagctcccgg atttttgagg ctttcttacg ccctttccga ggaaagactc 1140
 gttgagggtta taaggagaat aaagaaagcc cttgaagaga tctaa 1185

<210> 40
 <211> 394
 <212> PRT
 <213> Aquifex

<400> 40

Met Arg Lys Gly Leu Ala Ser Arg Val Ser His Leu Lys Pro Ser Pro
 1 5 10 15
 Thr Leu Thr Ile Thr Ala Lys Ala Lys Glu Leu Arg Ala Lys Gly Val
 20 25 30
 Asp Val Ile Gly Phe Gly Ala Gly Glu Pro Asp Phe Asp Thr Pro Asp
 35 40 45
 Phe Ile Lys Glu Ala Cys Ile Arg Ala Leu Arg Glu Gly Lys Thr Lys
 50 55 60
 Tyr Ala Pro Ser Ala Gly Ile Pro Glu Leu Arg Glu Ala Ile Ala Glu
 65 70 75 80
 Lys Leu Leu Lys Glu Asn Lys Val Glu Tyr Lys Pro Ser Glu Ile Val
 85 90 95
 Val Ser Ala Gly Ala Lys Met Val Leu Phe Leu Ile Phe Met Ala Ile

100	105	110
Leu Asp Glu Gly Asp Glu Val	Leu Leu Pro Ser Pro	Tyr Trp Val Thr
115	120	125
Tyr Pro Glu Gln Ile Arg Phe Phe Gly Gly Val	Pro Val Glu Val Pro	
130	135	140
Leu Lys Lys Glu Lys Gly Phe Gln Leu Ser Leu Glu Asp Val Lys Glu		
145	150	155
Lys Val Thr Glu Arg Thr Lys Ala Ile Val Ile Asn Ser Pro Asn Asn		
165	170	175
Pro Thr Gly Ala Val Tyr Glu Glu Glu Glu Leu Lys Lys Ile Ala Glu		
180	185	190
Phe Cys Val Glu Arg Gly Ile Phe Ile Ile Ser Asp Glu Cys Tyr Glu		
195	200	205
Tyr Phe Val Tyr Gly Asp Ala Lys Phe Val Ser Pro Ala Ser Phe Ser		
210	215	220
Asp Glu Val Lys Asn Ile Thr Phe Thr Val Asn Ala Phe Ser Lys Ser		
225	230	235
Tyr Ser Met Thr Gly Trp Arg Ile Gly Tyr Val Ala Cys Pro Glu Glu		
245	250	255
Tyr Ala Lys Val Ile Ala Ser Leu Asn Ser Gln Ser Val Ser Asn Val		
260	265	270
Thr Thr Phe Ala Gln Tyr Gly Ala Leu Glu Ala Leu Lys Asn Pro Lys		
275	280	285
Ser Lys Asp Phe Val Asn Glu Met Arg Asn Ala Phe Glu Arg Arg Arg		
290	295	300
Asp Thr Ala Val Glu Glu Leu Ser Lys Ile Pro Gly Met Asp Val Val		
305	310	315
Lys Pro Glu Gly Ala Phe Tyr Ile Phe Pro Asp Phe Ser Ala Tyr Ala		
325	330	335
Glu Lys Leu Gly Gly Asp Val Lys Leu Ser Glu Phe Leu Leu Glu Lys		
340	345	350
Ala Lys Val Ala Val Val Pro Gly Ser Ala Phe Gly Ala Pro Gly Phe		
355	360	365
Leu Arg Leu Ser Tyr Ala Leu Ser Glu Glu Arg Leu Val Glu Gly Ile		
370	375	380
Arg Arg Ile Lys Lys Ala Leu Glu Glu Ile		
385	390	